CLAIMS:

1. An optical data transmission method to transmit an optical packet composed of a header and data comprising steps of:

generating a second clock which has a frequency equal to one integer of that of a first clock carrying the data and synchronizes with the first clock; and

carrying the header information on the second clock.

2. The optical data transmission method of claim 1 wherein the second clock is phase-modulated by the header information.

3. An optical data transmission system to transmit an optical packet composed of a header and data characterized by that the header information is carried on a second clock which has a frequency equal to one integer of that of a first clock carrying the data and synchronizes with the first clock.

4. The optical data transmission system of claim 3 wherein the second clock is phase-modulated by the header information.

5. An optical transmitter to output an optical packet composed of a header and data, comprising:

a frequency divider to generate a second clock which synchronizes with a first clock carrying the data and has a frequency equal to one integer of that of the first clock;

a phase modulator to modulate a phase of the second clock by the header information; and

a data arranger to arrange the first clock carrying the data after the output data from the phase modulator.

6. The optical transmitter of claim 5 further comprising a converter to convert the output data from the data arranger into an optical signal.

7. An optical transmission method to output an optical packet composed of a header and data, comprising steps of:

generating a second clock which synchronizes with a first clock carrying the data and has a frequency equal to one integer of that of the first clock;

modulating a phase of the second clock with the header information; and

arranging the first clock which carries the data after the phase-modulated second clock.

8. The optical transmission method of claim 7 further comprising a step of converting the phase-modulated second clock and the following first clock carrying the data into an optical signal.

9. An optical switcher to switch an optical packet signal composed of a data carried on a first clock and a header carried on a second clock which has a frequency equal to one integer of that of the first clock and synchronizes the first clock, comprising:

a plurality of optical input terminals;

a plurality of optical dividers to divide each input light of

the plurality of the optical input terminals into two portions;

a plurality of header extractors to extract the header from one of the two portions divided by each of the plurality of the dividers;

a plurality of optical delays to delay the other of the two portions divided by each of the plurality of the optical dividers for a predetermined period;

an optical route switcher to switch a route of each output light from the plurality of the optical delays; and

a switch controller to determine a route of an optical signal to enter the corresponding optical input terminal and to control the optical route switcher according to output from each of the plurality of the header extractors.

10. The optical switcher of claim 9 wherein the each header extractor comprises a photodetector to convert an input light from the corresponding optical divider into an electric signal, a filter to extract a frequency component of the second clock from the output of the photodetector, and a demodulator to demodulate the header information from the output of the filter.